

SECTION 4 - CONTROL COMPARTMENT

8.4.1 GENERAL

- 8.4.1.1 CMS Control Equipment and associated wiring shall be furnished and installed in the Control Compartment. The equipment shall consist of:

- One - CMS Interface Panel (CIP)
- One - Power Distribution Assembly No.4 (PDA No.4)
- Five - Pixel Driver Assemblies (PXDAs)

Model 500 and 510

- Sixty - Pixel Driver Modules (PDM)

Where Xenon Pixels are used, Four – 5 KVA Transformers

Model 520

- Thirty - Pixel Driver Modules (PDM)

Where Xenon Pixels are used, Two 5KVA Transformers

- 8.4.1.2 All panels and assemblies shall be mounted on the 482.6mm (19-inch) Rack.
- 8.4.1.3 All circuit breakers, fuses, switches and indicators shall be readily visible and accessible when the CMS Control Compartment Front Door is open except for the PDM fuses which shall be located near the PDM connector.
- 8.4.1.4 All equipment when called out shall be clearly and permanently labeled. Marking strips shall be made of material that can be easily and legibly written on using a pencil or ballpoint pen. Marker strips shall be located immediately below the item to be identified and must be clearly visible with the item installed.
- 8.4.1.5 The assembly or panel depth dimension shall include the terminal blocks and assembly mounted part of the connectors.
- 8.4.1.6 All assemblies and panels shall allow air circulation through its top and bottom unless specifically called out otherwise.
- 8.4.1.7 Assemblies shall be fabricated of 1.59mm (0.0625-inch) minimum thickness aluminum sheet with metal surface treated with either clear chromate or anodized.

8.4.2 19-INCH EIA RACKS

- 8.4.2.1 The 482.6mm (19-Inch) EIA Rack shall be installed a minimum of 25.4mm (1.0 inch) inside the Control Compartment Front Door for mounting of the Control Equipment.
- 8.4.2.2 The 482.6mm (19-Inch) EIA Rack shall consist of a pair of continuous adjustable equipment mounting angles. The angle nominal thickness shall be either 3.42mm

(0.1345 inch) plated steel or 2.67mm (0.105”) stainless steel. The angles shall be tapped with 10 - 32 threads with EIA universal spacing. The angle shall comply with Standard EIA RS-310-B and shall be supported at the top and bottom.

- 8.4.2.3 Clearance between the mounting angles for mounting equipment shall be 450.85mm (17.75 inches).
- 8.4.2.4 The Model 500 vertical mounting surface shall be a minimum of 1689.10mm (66.5 inch) and the Models 510 and 520 vertical mounting surface shall be a minimum of 1168.4mm (46 inch).
- 8.4.2.5 The top of the mounting area to the center of the first screw hole shall be a minimum of 9.53mm (0.375 inch).

8.4.3 CMS INTERFACE PANEL (CIP)

- 8.4.3.1 The CIP mounting surface used for required equipment shall be recessed if necessary so that the equipment front surface is even with the CIP rack mounting front surface. The CIP shall have a maximum depth of 203.2mm (8 inch).
- 8.4.3.2 Service equipment and conductors shall be separated and isolated from the Controller Interface Terminal Blocks and Harness No.3.
- 8.4.3.3 A Twenty (20) Position minimum AC- Copper Bus(es) shall be provided. Two (2) 1/0 AWG wiring lugs shall be available on the Bus for AC Neutral Service Termination. The Bus shall have minimum ampacity capability of 400 Amperes. Nylon screws or standoffs shall be used to provide 500 megohms isolation between AC- and Equipment Ground & DC Logic Ground when tested at 250 VDC.
- 8.4.3.4 A Two (2) Position termination lug shall be provided for Equipment Ground on the CIP. A #10 AWG Conductor shall be routed from the CMS frame termination to the CIP and from the CIP to PDA #4, T2 Block Position #8.
- 8.4.3.5 The Equipment Ground shall be connected directly to the CMS Frame.
- 8.4.3.6 A 4-Pole 100 Ampere minimum rated Sign Disconnect Switch or circuit breaker shall be installed on the panel and designated for CMS Main Disconnect. Disconnect Line and Load Side Lugs shall accommodate No. 1/0 AWG Conductors.
- 8.4.3.7 Thirty 1 Pole 20 Ampere PXDA Circuit Breakers shall be furnished and installed to protect the PXDA Busses, 6 per PXDA. The Breakers shall be split into 15 breakers per lines L1 and L2 (1st 120 VAC leg) and 15 breakers per lines L3 and L4 (2nd 120 VAC leg). See Appendix for Assignments.
- 8.4.3.8 Controller Interface

8.4.3.8.1 A 44 Position Phoenix Contact, Type MBK 2.5/E, DIN Terminal Block or equal (CITB) shall be installed on the panel for CMS Harnesses #3, #4 and #5 termination.

8.4.3.8.2 CITB Terminals shall accommodate No.18 AWG conductors. Strain relief shall be provided for incoming Harnesses #4 & 5 Cable(s).

8.4.4 POWER DISTRIBUTION ASSEMBLY No.4 (PDA No.4)

8.4.4.1 The PDA No.4 shall meet all the requirements of the Power Distribution Assembly as specified in the TSCES (Chapter 6) including details as applicable except for the following:

8.4.4.1.1 The PDA No.4 shall consist of:

- 1 -- Duplex NEMA 5-15R Equipment Receptacle with GFI
- 1 -- 1 Pole 15 Amperes, 120 VAC Equipment Circuit Breaker
- 1 -- 1 Pole 15 Amperes, 120 VAC Main (includes Model 206 and Temp Control) Circuit Breaker
- 1 -- Model 206 Power Supply Module (+24 VDC) and Socket
- 1 -- 10 Position Terminal Block T2
- 1 -- 4 Position Terminal Block T3
- 1 -- CFP Connector
- 5 -- CEP Connector
- 1 -- CMS Isolation Module (CMS ISO MOD) and Socket Connector

8.4.4.1.2 Retaining Devices shall be provided mounted above the ISO Module and Model 206 Power Supply Module. Each device when locked down shall prevent the module from backing out of its connector. When not in use the device shall rest in a position allowing the module removal or insertion.

8.4.4.2 CMS Isolation Module (CMS ISO MOD)

8.4.4.2.1 The module shall optically isolate, receive/drive and condition DC Logic Signals from the Controller Cabinet (CIA) complying to RS 423 Standards at a minimum distance of 152.40m (500 Feet).

8.4.4.2.2 The total module load current shall not exceed 100 mA of +24 VDC power. Logic Voltage between the ISO Module and the LDMs shall be +12 VDC. The CIA Assembly shall supply the power for interface circuitry between the ISO Module and the CIA.

8.4.4.2.3 The front panel shall be fabricated of 2.29mm (0.090 inch) minimum thickness aluminum or stainless steel sheet. A momentary toggle switch shall be provided on the module front panel for Sign Lamp Test Function. Five indicators shall be provided on the front panel of the module to indicate the Dimming Signal, Clear State, Clock Signal, Device Enable and PXDA Latched State.

- 8.4.4.2.4 The addressing of the PXDAs shall be implemented on the module by decoding the upper three binary bits 5, 6 and 7 of the address bus to generate the PXDA select lines designated 1 through 5 (See Appendix details).
- 8.4.4.3 The CMS ISO MOD and PDMs shall have exclusive use of the Model 206 Power Supply.
- 8.4.4.4 A Gas Tube type Surge Protector shall be provided across T2 terminal positions 8(EGND), 9(AC+), and 10(AC-).

8.4.5 PIXEL DRIVER ASSEMBLY (PXDA)

- 8.4.5.1 The assembly shall have a maximum depth of 241.3mm (9.5 inch) (includes connector assemblies on rear of assembly).
- 8.4.5.2 The assembly shall intermate and support 12 PDMs, provide interface between the PDMs to the associated PMM, route AC and DC power to the PDMs and interface control signal lines to the PDMs.
- 8.4.5.3 The assembly shall have a PCB Motherboard for routing circuits to and from the lamp driver assembly connectors; PDM Connectors (1 through 12), CC Connectors (1 through 12), CD Connector, and the 6-position terminal blocks (or four 3 position).
- 8.4.5.3.1 Intercomponent wiring shall be by laminated copper clad track having a minimum weight of 4 ounces per square foot with adequate cross section for current to be carried.
- 8.4.5.3.2 All assembly connectors shall be mechanically supported to the frame of the assembly.
- 8.4.5.3.3 The PXDA-PDM connector shall be a 43/86S PCB Connector vertically centered. Guides, top and bottom, shall be provided to insert and support the PDM. The connector contacts shall start with pin 1 at the upper left when viewed from the PXDA front.
- 8.4.5.3.4 The AC+ and AC- Buses shall be routed across the PXDA from both sides (Terminal Block TBA1 assigned to PDM Connectors 7 to 12 and TBA2 assigned to PDM Connectors 1 to 6). The AC-Bus(s) and return shall be able to carry a minimum 60 Ampere Load. TB1 and TB2 blocks may be divided into four(4) 3 position Terminal Blocks, two for power and two for AC neutral.

8.4.6 PIXEL DRIVER MODULE (PDM)

- 8.4.6.1 General Requirements
 - 8.4.6.1.1 The module PCB connector shall be a 43/86P.
 - 8.4.6.1.2 Each module shall be interchangeable without modification or alteration to the module connectors and/or circuitry.
 - 8.4.6.1.3 One PDM shall exclusively control and operate one PMM.

- 8.4.6.1.4 Address lines incoming from the CMS ISO MOD (The 4-bit PDM Address lines and the associated PXDA Select line) shall be compared with the PDM slot address I.D. lines and PXDA Select I.D. lines on the module.
- 8.4.6.1.4.1 The slot address I.D. lines shall be decoded and implemented using hard-wire logic on the PXDA Motherboard adjacent to the PCB 43/86S connector. Five I.D. lines minimum shall be used as follows; the first four I.D. lines 1 to 4 shall be compared to the incoming PDM Address lines and the I.D. line 5 shall be compared to the incoming PXDA Select line.
- 8.4.6.1.4.2 Jumper wires, dip switches, and shunt jumpers shall not be used to decode and implement the hard-wire logic. Permanent solder traces with a resistor network or equal may be allowed.
- 8.4.6.1.5 The module shall be fused protected on the three incoming AC+ traces with three-5 Amperes Medium Blow Type Fuses. The Triac Load shall be evenly divided through the fuses and the three power buses (14, 13 and 13). The pattern shall be the same for all LDMs.
- 8.4.6.1.6 No more than 80 mA of +24 VDC power shall be used by each PDM.
- 8.4.6.2 Feature Requirements
- 8.4.6.2.1 The module shall consist of serial shift registers with parallel and latched tri-state outputs, 40 optically coupled triac drivers, 40 pixel load triacs and support circuitry to interface and control DC logic control signals to an external pixel load.
- 8.4.6.2.2 Pixel Load Triac Ratings:
1. 8 AMP On- State RMS Current
 2. 40 AMP Peak Surge Current for 1 full AC Cycle
 3. 400 Volt RMS Blocking Voltage minimum
 4. Maximum 3 ma Leakage Current either direction
 5. Maximum 3 us Turn On Time
 6. Maximum 5 AMP DC Gate Trigger Current
 7. The Triac shall not be a sensitive gate type